CLAIMS

1. A curable composition comprising:

(A) a vinyl polymer (I) comprising, at the molecular terminus, at least one group represented by the general formula (1):

$CH_2=C(R^a)-C(O)O-$ (1)

wherein R^a represents a hydrogen atom or a monovalent organic group having 1 to 20 carbon atoms

(B) a polymerization initiator, and

(C) a metallic soap.

2. The curable composition according to claim 1, wherein the vinyl polymer (I) has a molecular weight distribution of less than 1.8.

3. The curable composition according to claim 1 or 2, wherein the vinyl polymer (I) has a main chain produced by polymerization using as the main component at least one monomer selected from the group consisting of a (meth)acrylic monomer, an acrylonitrile monomer, an aromatic vinyl monomer, a fluorine-containing vinyl monomer and a silicon-containing vinyl monomer.

4. The curable composition according to any one of claims 1 to 3, wherein the vinyl polymer (I) is a (meth)acrylic polymer.

5. The curable composition according to any one of claims 1 to 4, wherein the vinyl polymer (I) is an acrylic polymer.

6. The curable composition according to any one of claims 1 to 5, wherein the vinyl polymer (I) is an acrylic ester polymer.

7. The curable composition according to any one of claims 1 to 6, wherein the vinyl polymer (I) has a main chain produced by living radical polymerization.

8. The curable composition according to claim 7, wherein the living radical polymerization is atom transfer radical polymerization.

9. The curable composition according to claim 8, wherein the atom transfer radical polymerization uses as the catalyst a transition metal complex having an element from the 7th, 8th, 9th, 10th, or the 11th group of the periodic table as the central metal.

10. The curable composition according to claim 9, wherein the metal complex used as the catalyst is a complex of a metal selected from the group consisting of copper, nickel, ruthenium and iron.

11. The curable composition according to claim 10, wherein the metal complex used as the catalyst is a copper complex.

12. The curable composition according to any one of claims 1 to 11, wherein the component (A) is a vinyl polymer obtained by the following steps of:

(1) polymerizing a vinyl monomer by atom transfer radical polymerization to produce a vinyl polymer having a terminal structure represented by the general formula (2):

$-C(R^1)(R^2)(X)$ (2)

wherein R^1 and R^2 represent a group connected to an ethylenically unsaturated group of the vinyl monomer; and X represents chlorine, bromine or iodine,

and

(2) converting a terminal halogen of the polymer into a group represented by the general formula (1).

13. The curable composition according to any one of claims 1 to 12, wherein the component (A) is produced by the following step of:

reacting a vinyl polymer having a halogen group at the terminus with a compound represented by the general formula (3):

$M^{+-}OC(O)C(R^a)=CH_2$ (3)

wherein R^a represents a hydrogen atom or a monovalent organic group having 1 to 20 carbon atoms; and M^+ represents an alkali metal ion or quaternary ammonium ion.

14. The curable composition according to claim 13, wherein the vinyl polymer having a halogen group at the terminus has a terminal structure represented by the general formula (2):

$-C(R^1)(R^2)(X)$ (2)

wherein R^1 and R^2 represent a group connected to an ethylenically unsaturated group of the vinyl monomer; and X represents chlorine, bromine or iodine.

15. The curable composition according to any one of claims 1 to 12, wherein the component (A) is produced by the following step of:

reacting a vinyl polymer having a hydroxyl group at the terminus with a compound represented by the general formula (4):

$X^1C(O)C(R^a)=CH_2$ (4)

wherein R^a represents a hydrogen atom or a monovalent organic group having 1 to 20 carbon atoms; and X^1 represents chlorine, bromine or a hydroxyl group.

16. The curable composition according to any one of claims 1 to 12, wherein the component (A) is produced by the following steps of:

(1) reacting a vinyl polymer having a hydroxyl group at the terminus with a diisocyanate compound, and

(2) reacting the remaining isocyanate group with a compound represented by the general formula (5):

$$HO\text{-}R'\text{-}OC(O)C(R^a)=CH_2 \quad (5)$$

wherein R^a represents a hydrogen atom or a monovalent organic group having 1 to 20 carbon atoms; and R' represents a divalent organic group having 2 to 20 carbon atoms.

17. The curable composition according to any one of claims 1 to 6, wherein the vinyl polymer (I) has a main chain produced by polymerizing a vinyl monomer using a chain transfer agent.

18. The curable composition according to any one of claims 1 to 17, wherein the vinyl polymer (I) has a number average molecular weight of 3000 or more.

19. The curable composition according to any one of claims 1 to 18, wherein the component (B) is a photopolymerization initiator.

20. The curable composition according to claim 19, wherein the photopolymerization initiator is a radical photopolymerization initiator.

21. The curable composition according to any one of claims 1 to 18, wherein the component (B) is a thermal polymerization initiator.

22. The curable composition according to claim 21, wherein the thermal polymerization initiator is selected from the group consisting of an azo initiator, a peroxide, a persulfate, and a redox initiator.

23. The curable composition according to any one of claims 1 to 22, wherein the component (C) is a metal salt of stearic acid.

24. The curable composition according to claim 23, wherein the component (C) is one or more selected from the group consisting of magnesium stearate, zinc stearate, calcium stearate, sodium stearate and potassium stearate.

25. The curable composition according to claim 23, wherein the component (C) is magnesium stearate and/or zinc stearate.

26. The curable composition according to any one of claims 1 to 25, further comprising reinforcing silica (D).

27. The curable composition according to any one of claims 1 to 26, comprising from 0.025 to 5 parts by weight of the component (C) relative to 100 parts by weight of the component (A).

28. A method for improving the mold release properties of a cured product obtained from curable composition comprising (A) a vinyl polymer having, at the molecular terminus, at least one group represented by the general formula (1):

$CH_2=C(R^a)-C(O)O-$ (1)

wherein R^a represents a hydrogen atom or a monovalent organic group having 1 to 20 carbon atoms), and (B) a polymerization initiator, the method comprising incorporating (C) a metallic soap into the curable composition.

29. A cured product obtained from the curable composition according to any one of claims 1 to 27.

30. The cured product according to claim 29, wherein the cured product is a molded product, and wherein the molded product is substantially not broken upon removal of the molded product from a mold after manufacture.